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GLOBAL BUSINESS REPORTS

The Spotlight on a Mexican Success Story

Introducing Mexico: The Next Big Thing?

This report was researched and
written by Global Business Reports

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The Eurus wind park in the state of Oaxaca, with 250.5 MW already in service, has the highest installed capacity in Latin America and is the biggest built by Acciona in the world.

A host of opportunities

The birth of a key regional hub

Mexico at a Glance

Source: CIA World Factbook, various

Population: 114,975,406 (July 2012 estimate)

Capital: Mexico City

Head of Government: President Enrique Peña Nieto

Currency: Peso (MXN)

GDP: \$1.163 trillion (2012 estimate)

Growth Rate: 3.8% (2012 estimate)

GDP per Capita: \$15,300 (2012 estimate)

Economic sector breakdown: agriculture: 3.7%, industry: 34.2%, services: 62.1% (2012 estimate)

Exports: \$377.4 billion (2012): manufactured goods, oil and oil products, silver, fruits, vegetables, coffee, cotton

Imports: \$379.4 billion (2012): metalworking machines, steel mill products, agricultural machinery, electrical equipment, car parts for assembly, repair parts for motor vehicles, aircraft, and aircraft parts

Major Trade Partners: US, Canada, China

Upon conquering the Tabasco region in 1519, Hernán Cortés, leader of the Spanish conquistadors, was given 20 slaves. One of these was to change Mexican history and become a notorious figure, at times reviled and at others pitied: La Malinche, betrayer of her people or a victim herself, was a trusted advisor, translator, and mistress of Cortés. Her choice to favor the Spanish over her own people played a vital role in the success of the Spanish invaders.

Today, La Malinche Syndrome refers to the assumption that foreign products and solutions must be better than Mexican

ones. As Fernando Calvillo, CEO of Mexican gas infrastructure company Fermaca, explained: "If you go to France, the French government supports Gas de France; in Spain, they support Gas Natural; if you go to Canada, Transcanada. If you come to Mexico the complete opposite occurs."

If to some extent, Mexico is looking outwards towards foreign markets, it is equally true that foreign investors are looking towards Mexico. As companies flee the economic storms of Europe, they find in Mexico a host opportunities and competitive advantages in a number of sectors. With the potential to become one of the top 10 most powerful economies in the world, Mexico is becoming a key regional manufacturing hub, and the power sector – a complicated mix of private sector participation combined with public ownership – fuels this growth.

Meeting the Needs of the Mexican People

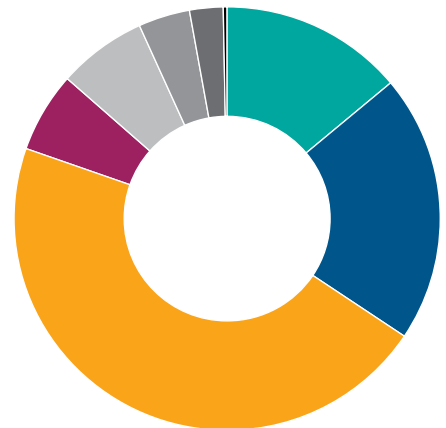
Energy demand in Mexico, according to the Secretary of Energy (SENER), will increase by approximately 4% each year for the next ten years, and with it the potential for private sector growth in the industry.

Gaston Aragon, regional manager of Caterpillar Latin America, highlights the importance of Mexico: "In Mexico we were able to close a deal with a 40 MW power plant, due to the high efficiency nature of our products. It is an EPC turnkey project and it is the largest power plant in Mexico with reciprocating engines. Brazil and Mexico are key strategic countries that have the largest growth potential for our business in Latin America."

Luis Alvarez, General Manager of Atlas Copco Mexico, offers an example of how

the Mexican energy sector is able to produce its own privately generated success stories. "Currently, our revenues account for about 70 million USD and we are aiming to increase that number up to 100 million by 2015. This suggests that we need to grow at about 20% per year which is a relatively conservative strategy. On the other hand, if the government manages to incentivize the oil and gas industry correctly, I believe that we would be able to achieve much higher growth in the upcoming years," he says.

In Mexico, electricity supply is constitutionally deemed a public service. As a result (and much like South Africa's Eskom) the Federal Commission of Electricity (CFE), the state-owned electricity giant, controls transmission and distribution, and is responsible for 76.9% of generation. It offers services to the whole population, including technically challenging and financially unrewarding rural areas. It is hard to believe that Mexico's electricity sector was once a laissez-faire market which came to an end with CFE's



Mexico Electrical Generation by Type (GW-hour)

Source: SENER (2011)

Hydroelectric	35,796
Thermal (natural gas & diesel)	53,126
Combined Cycle	118,445
Dual (natural gas & diesel)	15,396
Coal-fired	118,445
Nuclear	10,089
Geothermal	6,507
Wind	6,507



Luis Alvarez,
General Manager
of Atlas Copco
Mexico



Ian Malo,
Subsecretary
of Electricity



Manufacturing Excellence: Air Compressor in the Mexico City factory of Atlas Copco

birth in 1937. Perhaps ironically, the state-owned monopoly was conceived as a way of protecting Mexican end-users from the exploitation of a foreign-owned monopoly (85% of investment in transmission and distribution from 1900 to 1910 was British).

Mexico's Balancing Act

Like PEMEX, the government-owned oil and gas giant, CFE is a company that is

an extension and embodiment of government energy policy. In contrast to PEMEX, however, CFE has arguably been more successful at developing collaboration between public and private interests and fostering foreign investment. There are, for example, no issues in the power industry comparable to the dearth of refining capacity that forces Mexico to export oil and import gasoline. On the contrary, CFE's figures are strong across the board: 98% of the population have access to electricity; interruption time per customer (ITC) was 9.3 minutes per annum in 2012, compared to 59 minutes in 2010; and the connection of new customers to the grid has similarly fallen from 6.9 days in 2009 to 1.5 days today, whilst industry has seen the improvement from a 37 day waiting time to three. Though CFE defends the Mexican people's right to have access to electricity as cheaply as possible, in recent years, thanks to the introduction of IPPs and Public Finance Works (OPFs) – which are similar to Build, Lease, Transfer agreements (BLT) – the Mexi-

can power sector has nonetheless been able to diversify and develop the best practices that private sector competition can promote.

Independent Power Producers

The 1992 Electricity Public Service Law allows for some private investment in generation, provided that the energy generated is not for public use but for self-supply, co-generation, export, or for sale to CFE through a long-term power purchase agreement (PPA). Both export and sale to CFE come under the banner of independent power production, a term covering any authorized power plant of over 30 MW and catering to those two markets. Co-generation and self-supply, on the other hand, are variations of the same thing: the consumer generates the power used, in some cases with the help of an external company in which the generation project, for the purposes of legality, is treated as a joint venture. Avoiding competition with CFE, private participation in essence cannot have direct access

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to the consumer in the way that CFE and most utility companies outside of Mexico do. "When the government changed their energy policy to allow IPPs, we used this as an opportunity to become the second largest IPP in Mexico," explains Koji Ishimatsu, president of Mitsui in Mexico. "One of our core business areas is concessional infrastructure, in particular power and water-related activities. We are the leading developer in the Manzanillo gas pipeline project along with other gas infrastructure projects to supply Mitsui power stations. Very recently we decided to participate in 15% of Gas Natural Mexico."

Power Purchase Agreements

Jaime de la Rosa, President of the Association of Mexican Energy, highlights the advantages of combining public and private in this way: "With this scheme, CFE does not need to find the resources to build power plants, which are very expensive. Instead, we, the private sector, are the investors. We maintain and operate the plants. The plants belong to us and we have a long-term contract – a Power Purchase Agreement (PPA) – which means that CFE only has to pay for the electricity produced. So it defers investment to the private sector leaving CFE to develop transmission lines, infrastructure, distribution, sub-stations and other similar projects. Once a tender has been won, CFE is your long-term partner and client."

In order to be awarded a PPA however, the main criteria on which the IPP-to-be is judged is cost, which jeopardizes the chances of an attractive rate of return for private companies. Meanwhile, the tariff structure for the end-user also reflects a certain downward price distortion for residential and agricultural users, and so rather than being economically motivated, the structure is in fact socio-political. The efficacy of such a system is questionable. Francisco Salazar, chairman and president of the Energy Regulatory Commission (CRE) says: "CRE should have the responsibility of setting the public service rates whereas currently it is the treasury that sets those rates. They do not have enough staff to do that and the current rates were constructed back in the eighties. They do not reflect the reality of the sector and are not designed to promote efficiency either within



Koji
Ishimatsu,
President
of Mitsui



Jaime de
la Rosa,
President
of AME

CFE or for end-users. The scheme must be changed."

Law of Public Works

An additional way in which private companies can participate in the sector is through OPFs, in which companies build and operate CFE power plants and other generation projects, such as hydropower. A major advantage of the scheme is the long-term nature of the contracts, allowing financing to be spread over 25 years. "The difficulty of obtaining financing is noted across all industries due to the credit crunch. Projects in the power industry are long term and have intensive assets, requiring significant investment. Because the CFE is an AAA company, projects with the CFE do not struggle as much to obtain financing. However a challenging interest rate is certainly posing difficulties," Carlos Carrillo, Assurance Services Advisor at leading global advisory firm Ernst & Young, explains.

The Climate Change Law: More Talk Than Walk?

CFE's commitment to low costs and subsidies, which favor power generated from combined-cycle gas power plants, is in opposition to another, important obligation: the new Climate Change law that demands that 35% of Mexico's energy matrix must be from clean energies by 2024. Meanwhile, renewables have been developing in Mexico without subsidies, and look likely in the foreseeable future to continue to compete without them. Jorge Guadarrama Yáñez and Pedro Morales, both lawyers at leading global law firm Baker & McKenzie, are skeptical. "The new Climate Change law fosters the

use of clean energies and aims to ensure that 35% of Mexico's electrical power is generated from clean sources by 2024. However, this law is essentially toothless as there is no real concrete way of it being enforced. It is a framework law without any sanctions (with the exception of reporting obligations), so it is a starting point but by no means sufficient to trigger any real change within the Mexican energy market. Though renewables rather than carbon have become the focus in both this law and wider discussions on energy, the law establishes foundations for carbon regulations that need to be built upon," Pedro Morales argues.

"Currently, the carbon market is struggling and needs a substitute for Kyoto. In addition, to create any significant changes in the sector, there need to be tax incentives. Currently renewable energies are competing against oil and gas which are not only cheaper from the outset, but subsidized by the government through residential and agricultural electricity tariffs that do not reflect the actual cost of generation," Jorge Guadarrama Yáñez adds.

The Golden Age of Gas: Strong Demand and Critical Shortage

Though gas imports increased by 17% this year, there were over 20 critical gas alerts when the country was dangerously close to failing to meet demand. Nonetheless, gas is the most important energy source in Mexico's energy matrix

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and whilst fuel oil costs have increased by 71% compared to 2007, gas prices lowered by 79% in the past five years, from \$12 to \$2.5 per BTU (British Thermal Unit), making gas exceedingly attractive.

The Inopportune Opportunity

The abundance of shale gas in America has further emphasized the attractiveness of gas and has a second, logical conclusion: the geographical proximity of the US and some shared geological characteristics between the two countries suggests that there could be significant shale gas discoveries in Mexico as well. However, gas is not a priority for PEMEX; being responsible for 40% of the federal government's budget, it makes more sense for PEMEX to focus on more profitable areas, namely oil. Of the gas that PEMEX does produce, 47% is used for its own purposes: to increase its oil production by re-injecting it in the wells, for operation, and for refining.

Francisco Salazar of the CRE explains the paradox of the inopportune opportunity: "Mexico is very rich in gas reserves, but the problem is that with the prices currently so low, it is very difficult to develop new projects. The other constraint is that we only have one producer of gas, PEMEX. The only way that we can increase the Mexican output of gas is by opening the sector so that other players can come. Though PEMEX produces gas,

it is mainly an oil producer; there is a higher economic return for oil. There is plenty of gas in the US close to the Mexican border allowing for easy exportation, however the infrastructure is not as robust as we need it to be. We warned about this about five years ago, but because at the time demand was dropping, our warnings were not listened to. Currently it will take a couple of years before the pipelines will be on-line. We can solve this problem temporarily by importing LNG as we have 3 LNG terminals that were built in the past ten years and PEMEX and CFE are building compression units."

Investing in the Future

Though PEMEX is responsible for all exploration and production in Mexico, when it comes to supplying industry and combined cycle plants, CFE has the right to tender a number of gas pipeline projects in an effort to meet the country's growing energy needs. "Infrastructure investment has been a key issue for Mexico over the last 12 years. Historically Mexican presidents tended to focus on only one sector. President José de la Cruz Porfirio Díaz, for example, invested only in railways, and other presidents focused primarily on oil and gas or highways. With the last two administrations, we began to see the adoption of a more integral approach to the infrastructure market. The government's goal is to make Mexico highly

competitive, which has led to better strategic long term planning," says Alejandro Villarreal, partner at KPMG's Global Infrastructure & Projects Group.

For this long term planning to be successful, CFE is increasingly focused on augmenting its gas infrastructure capacity. "The key issue for CFE is how it will sufficiently develop the necessary gas infrastructure to supply gas to its combined cycle gas power plants, as well as to allow private businesses to connect themselves to the supply. In order to maintain production levels, a lot of companies are dependent on gas and many, depending on their region, are deeply affected by gas shortages. As a result, there is a major opportunity for gas pipeline developers to benefit," highlights Juan Fernando Ibáñez Montaña, senior partner at Ibáñez Parkman Abogados, a local law firm.

Building a Network of Supply

4,347 km of new pipelines are to be built in addition to the current 12,295 km currently in operation, 9,043 km of which are owned by PEMEX. This is an opportunity for companies such as Transcanada – who have been awarded the large Manzanillo project – and Fermaca, a 100% Mexican-owned gas infrastructure company. David Shields, editor of local energy magazine *Energia a Debate*, identifies a key problem in the development of the pipelines; the current price referenc-

Labor Reform: Outsourcing Regime

By: Marcela Calderon, Human Capital And State Obligations Director, Kpmg Mexico

The results of the National Occupation and Employment Survey by the National Institute of Geography and Statistics (INEGI) indicate that in the third quarter of 2012 the informal employment modalities numbered up 29.3 million people, of which 6.8 million are related to registered family businesses and non-agricultural companies, among others.

It is precisely in this line of business in which outsourcing practices – though a business model that unintentionally encourages labor specialization – tend not to recognize the entirety of the labor relationship, together with its tax and social security consequences. It is this situation that has motivated the



changes made to the tax legislation regarding outsourcing.

The outsourcing regime bypasses tax liabilities and tax costs derived from labor relationships through legal definition: The contractor is defined as an employer who undertakes work, or renders services with workers who depend on him or her rather than the contracting party (in other words, the beneficiary from the service), even though it is the contracting party who is in fact responsible for establishing the contractor's tasks and supervising completion of those tasks.

However, this type of work must comply with the following conditions:

- 1 It cannot cover all the activities, equal or similar in total, developed at the work site.
- 2 It shall be justified due to its specialized nature.

3 It cannot include tasks equal or similar to the tasks performed by the rest of the workers working for the contracting party. In the event of these conditions not being met, the contracting party will be considered the employer for all labor purposes and regarding social security.

Even if there are some concepts that will be susceptible of legal construction, it is clear that the inclusion of these provisions has the purpose of setting the foundation for outsourcing becoming exactly the specialization of labor, and not the evasion of working and tax liabilities derived from the labor relationship.

Therefore, we can say that with regards to outsourcing, the Labor Reform is progressing in terms of incorporating into the formal labor market the 6.8 million people who are currently in the informal sector. However, the effectiveness of the Reform will depend on how it is engaged with other strategic reforms that are now in progress.

ing system has resulted in the distortion of market signals, making investment more difficult and less profitable. "Mexico has the potential to produce a lot more conventional and non-conventional gas – shale – and as you produce more, the argument for infrastructure obviously increases. There is an interest right now in importing more shale gas, which is also a justification for increased infrastructure. Mexico has a system in which energy prices, especially the fuels from the oil industry – gasoline, crude oil, fuel oil and natural gas – have had their prices linked historically to the prices in the United States; in other words, the reference price. Essentially, if you have a cubic meter of natural gas in Mexico, why would you sell it in Mexico for \$2 when you can sell it in the US for \$4? As a result, the prices have been linked and this is a system that has worked reasonably well in the past. However, with natural gas, this system starts to have cracks; the natural gas at \$3 per cubic feet in Mexico reflects conditions in the US market in which there is a glut of natural gas, where there is vast infrastructure that we do not have in Mexico. The price of natural gas in Mexico of \$3 per cubic feet is artificial; it does not reflect the realities of the Mexican market, nor does it reflect infrastructure and supply. It is a gas price that is causing demand to rise with no ability to in fact meet that demand," he says.

Despite these fears, Calvillo, CEO of Fermaca, is quietly confident of his company's ability to retain competi-

tive costs, a key advantage which allowed Fermaca to win the Chihuahua bid.

Calvillo's focus is on the opportunities he sees in the market during "the golden age of gas."

"Once these pipelines are built and online, Fermaca will be responsible for the transportation of 20% of Mexican gas consumption. In the past three years, our growth has been phenomenal; we are 10 times bigger in terms of company value. Now we're seeking to win several of these projects and position ourselves as the most important natural gas pipeline company in Mexico. We have invested \$600 million in the past four years and have been very fortunate to close our financing."

The Impact of Subsidies

Another factor that continues to make gas extremely attractive in Mexico is the presence of subsidies, which affect the market in a number of ways. The CFE tariff structure is designed to subsidize the cost of electricity that is consumed by residential and agricultural end-users and offers preferential rates to low consumption households whilst penalizing high consumption households. However, as a direct method of tackling poverty this is ineffective. In 2009 The World Bank claimed that "the subsidies delivered through the tariff structure are regressive, with the poorest 40% of households capturing only about 30% of the subsidies. This is significantly less than they would receive if subsidies were randomly distributed to all utility customers. In contrast, the

richest 40% of households receive 50% of the subsidies."

These subsidies also create an unfavorable regulatory environment for renewables which, whilst already seen to be more expensive and less profitable than conventional fuels, must in addition compete within the Mexican market on an uneven playing field.

The Renewables Sector: In need of a helping hand?

Whilst some countries in Europe have set aside subsidies for technologies whose appropriateness is not immediately apparent, Mexico does not have subsidies for renewables yet possesses some of the best resources in the world. The development of renewables has become headline news as climate change fears grow, but it also plays an important role in protecting against price shocks through a diversified energy basket. Estefano Conde, manager of social communication for CFE, highlights the achievements in the sector to date: "Former President Calderon aimed to increase the participation of renewables in the energy matrix to 25% and, at the close of his administration, CFE met that goal. A key factor in this is the development of major hydroelectric projects."

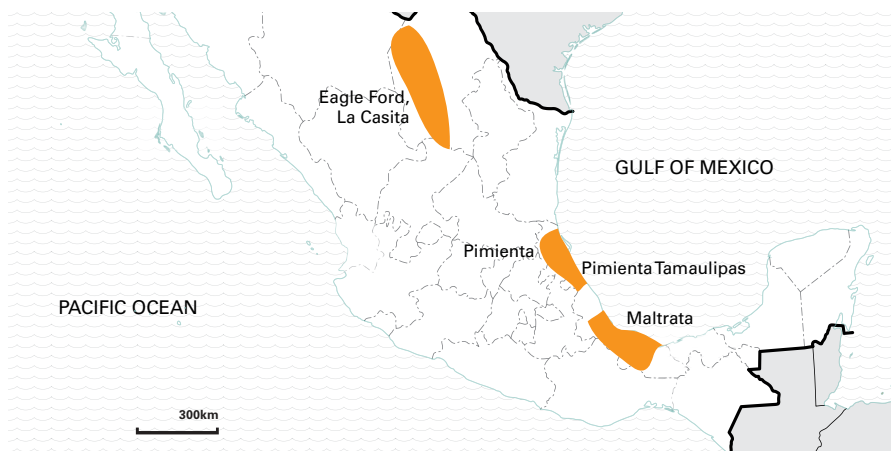
Mexico's further aim to source of 35% of its energy from clean energies by 2026 will be achieved through the market's unique synergy between political will and private means.

Vicente García Montero, commercial director of Isolux Corsan Mexico, the Spanish engineering giant, explains the balance as it applies to the Isolux Corsan: "Our main client is CFE as they are the main player. Now that the private sector is increasingly important due to co-generation and self-supply, we are diversifying our client base into the private sector. We offer assistance in transmission and wind farms projects for example."

IPPs supply 23.1% of Mexico's energy, which represents 12,213 MW, but with IPPs aside, the private sector permits represent an extra 10,011 MW of installed capacity, 48% of which is self-supply and 33% is co-generation (the rest consists

Prospective Shale Gas Basins

Source: US Energy Information Administration



of projects too small to count under the IPP scheme, along with export and import projects). Despite the lack of subsidies, the renewables sector has seen good growth and an influx of foreign direct investment (FDI). In 2012, there were 200 plants for renewable power generation either open or under construction, and between 2003 and 2012, despite CFE's hold over the industry, FDI in renewables reached \$6.9 billion. The majority of these investors have come from Spain, US, France, Japan, and Denmark, and their investments center around the states of Chihuahua, Baja California (which has strong solar potential), Nuevo León, Tamaulipas, and Oaxaca (both of which have strong wind potential).

The Competitive Edge

Renewables have a number of competitive advantages contributing to investor interest. In remote areas of Mexico in which connection to the grid is difficult and expensive, renewables are cheaper. In addition, the stability of renewables



400 kV Substation Julie - Veracruz | Mexico, Courtesy of Isolux

and their downward trend with regards to costs allows for long-term energy planning in a way that the more volatile prices of gas make difficult. Lastly, and perhaps ironically, the very thing that may discourage the use of renewables for some users – the CFE tariff subsidies – are also what can make renewables more attractive to others. High consumption users in the manufacturing sector that require energy during peak hours are heavily charged and will find self-supply schemes

and co-generation projects better value for money than buying directly from CFE.

Co-generation

Co-generation, as distinct from IPPs, is being used with success by Mexico's industries as an alternative to relying on CFE, whilst nonetheless avoiding direct competition. The 250-MW Eurus wind project was developed by Acciona Energy for CEMEX, a Mexican multinational cement producer. Grupo Bimbo, Mexico's main bread producer, is supplying its plants with energy generated from a 90MW wind plant in partnership with Renovalia's subsidiary Desarrollos Eólicos Mexicanos. Small, private hydro-power projects have also been developed and represent 292 MW of capacity. Partly due to private investment and partly due to CFE's own commitment to the development of renewables, installed capacity has increased from 12,092 in 2006 to 14,095 MW. Pedro Pradanos, director general of Dalkia, a co-generation and energy efficiency company, explains what

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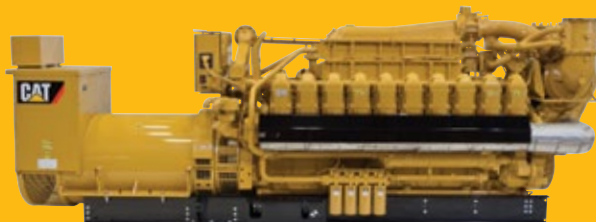
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Dalkia can offer to its clients: “Co-generation, which we regularly get involved in, is one of the main solutions available in the Mexican energy market and can generate electrical, thermal, and/or other energies. Dalkia’s co-generation projects represent nearly 5000 MW of installed capacity worldwide. In Mexico, we are currently developing a co-generation project in Queretaro with an industrial client. Here, we are installing the 2 MW CHP system and will maintain and operate it for the next seven years. This will allow the client to achieve more than 30% in savings. The project started off with an energy analysis, after which we presented a variety of options and solutions to the client. We recommended one, and developed it. We are not committed to a single technology; we seek a comprehensive tailor-made solution for each case and each client in particular.”

Rushing Wind

Wind power potential in Mexico is estimated at 71,000 MW and in the past few years has seen strong growth. Due to the meteoric conditions, wind is the strongest of all the renewables in Mexico. Adrian Katzew, general manager for Vestas Mexico, Central America and the Caribbean, one of the market leaders of wind turbine manufacturing in the world, details the factors that have drawn Vestas and similar companies to Mexico: “The move away from subsidies for renewables in Europe, along with the expiry of the production tax credits in the US next year, has shifted demand from mature markets to emerging markets. It is a phenomenon that is extremely interesting; growing up in Mexico, I would have never thought that Mexico would become a leading, world-class example of macro-economic and financial management, and yet here we are. Mexico is attracting foreign investment and we are seeing a new wind market emerge. Wind power today from a cost point of view is more attractive than any other alternative; there are no subsidies, and yet wind power is succeeding in Latin America and the Caribbean. In addition, the difficulties of financial institutions in Europe has resulted in a difficulty in financing projects, but the role of multilateral agencies in supporting development in emerging markets allows the financing of projects. As a result, it

is easier to finance projects in emerging markets, which is fueling our growth. In Mexico, CFE and self-consumers are investing in wind power because they have found that it is more competitive.”

Solar’s First Steps

Solar, in contrast to wind, has yet to be developed. The cuts in subsidies in Europe have caused a glut of solar panels that has pushed the price of equipment down, and the attractiveness of the technology up. As a result, solar companies typically report a year-on-year growth of up to 100%, though this percentage is taken from a very low baseline and the market is still immature. The potential, however, is very strong. Mexico is located across the ‘Sun Belt’ and is among the countries with the highest solar power generation potential worldwide. The solar radiation potential in the northwest of the country can exceed 6 kWh/m² per day. In addition, Mexico is the main supplier of photovoltaic solar modules in Latin America, with a production capacity of more than 276 MW, which also opens up opportunities to supply the nearby US market. “Latin America overall, and Mexico in particular, has declared its interest in this source of renewable energy and there is a lot of growth potential in this area. Taking this into account as well as the global decrease in the price of the panels, we believe that 2013 will be the year that will offer many possibilities for the photovoltaic sector. However, in order for the photovoltaic developments to be profitable we need to make sure that the tariffs offered in the Mexican market are competitive not only with respect to the ordinary sources of energy but also with respect to the wind power tariffs,” says Miguel Angel Alonso Rubio, director general of the Mexican chapter of Spanish renewables giant Acciona.

Yes(ca) to Hydro-power

Hydroelectric power is, of all renewables, the most developed and widely accepted as competitive. With a hydroelectric potential of 53,000 MW, Mexico confirmed its commitment to hydropower with the opening of La Yesca, arguably the most important infrastructure project of the Calderon administration. Built by construction firm ICA, La Yesca has a capacity to hold 2.39 billion square meters of

water and an installed capacity of 750 MW. CFE’s ambitions cannot be realized without private sector help. Raul Casas, service and rehabilitation manager at Andritz Hydro, an international hydropower equipment design and manufacturing company, describes the context of the market: “The Mexican market is not a fixed volume market; it is cyclical and depends on the political situation. It is difficult for CFE to maintain a well-defined agenda of scheduled projects. CFE is currently trying to define the next big project after La Yesca. We work mainly with the operational side of CFE, and the coordination of hydro to improve, maintain, and enhance, the performance of existing hydroelectric plants.”

Geothermal and Biogas

Projects of the scale of La Yesca are not confined to hydropower however; at 750MW, the Cerro Prieto Geothermal Power Station is the largest of its kind in the world and geothermal energy potential in Mexico is greater than 40,000 MW. Biomass is also a rapidly growing sector that has a number of attractive opportunities, many of which are in the Veracruz area. Gaston Aragon of CAT explains: “Opportunities are in the north where there are large ranches with cows and horses which allow us to produce energy from the waste using biogas processes. In this way, companies can reduce their energy bill. It is an emerging market in the whole of Latin America that consists of natural waste that is subject to anaerobic digestion, which as a result produces biogas that can be used to power motors. A whole technology must be built around maintaining a stable environment so that the bacteria do not die; temperature and food supply must always be kept optimal to maintain the levels of biogas produced.”

The Forks in the Road

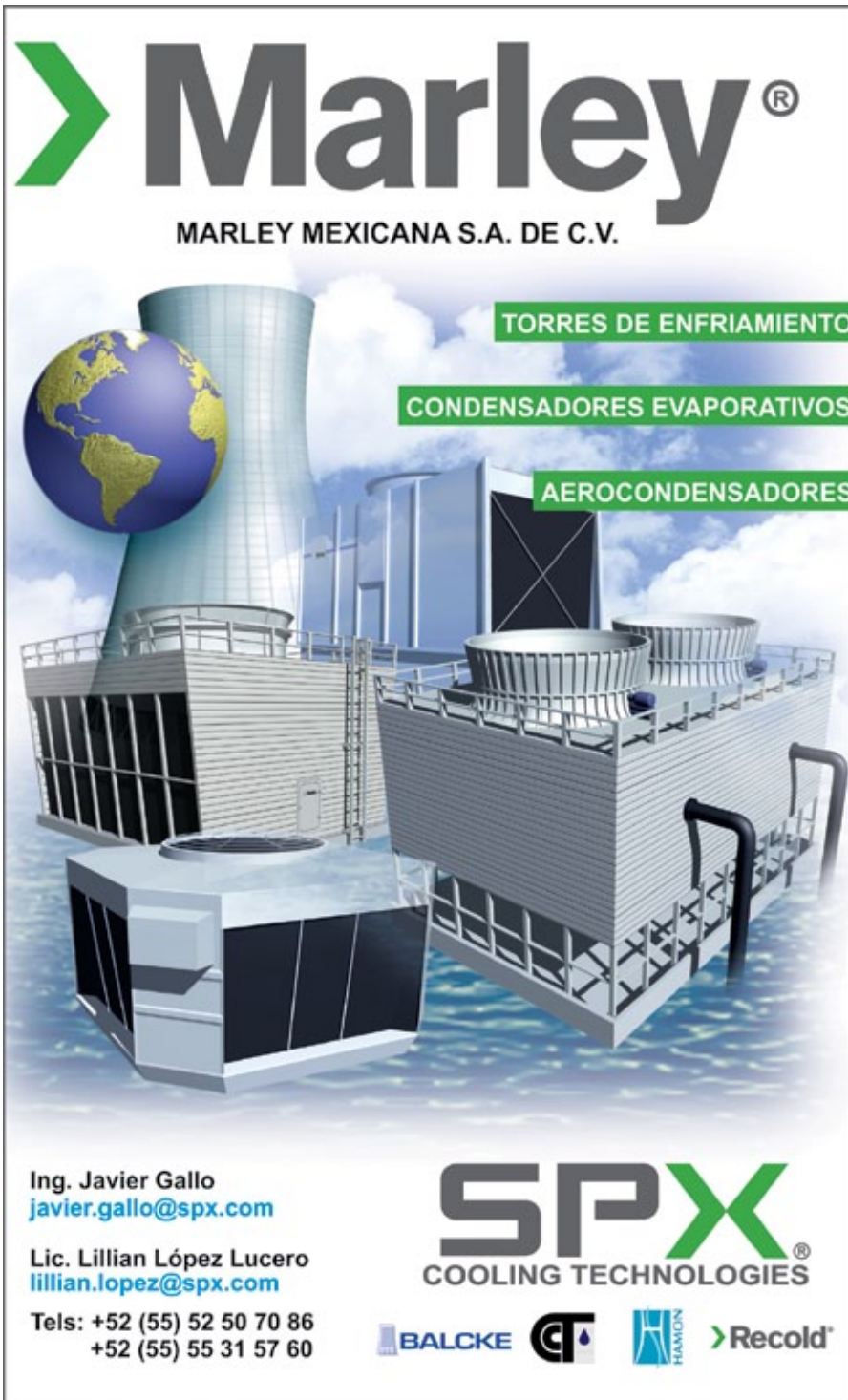
The exact breakdown of the projected 35% of clean energies has been split by SENER into three possibilities scenarios: Firstly – and arguably the easiest way of achieving the 2026 aim – is to develop a matrix with a focus on nuclear, which would account for 18.1% of Mexico’s energy. Vicente Estrada-Cajigal, president of the National Solar Energy Association (ANES) disapproves: “The National En-

ergy Strategy mentions 'clean energy,' thus calling for nuclear power but not for the separation of renewable energy and nuclear energy. ANES has requested that the Secretary of Energy recognizes a difference between nuclear power and renewable energy, because nuclear's categorization as clean energy is a panacea that allows Mexico to meet global com-

mitments whilst disguising the reality of Mexico's energy matrix. There is talk of non-fossil fuels and fossil fuels, but ANES in addition advocates the use of renewable or non-renewable in discussions about energy; references to 'clean energy' are not enough," he asserts.

However, after the events at Fukushima, a focus on nuclear is likely to be met with

strong public disapproval. Mexico is also earthquake-prone. The second option is a purely renewables focus, in which nuclear retains its current 2.5% whilst wind would account for 20.9% and hydropower for 9.2%, with the rest divided by geothermal, solar, and biogas. A hybrid matrix would be an attempt to catch the best of both worlds by having some nuclear development – to a total of 6.6% – accompanied by slightly less wind development.



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Moving Forwards

Although renewables are in what would initially seem to be a disadvantageous position in the Mexican market, foreign and local companies alike have been able to carve a niche for themselves and, despite problems, the future is green. "I do not think that the green industry is going to go away; we took advantage of a great wave of growth in wind over the past decade, and now there are new technologies on the cusp of development," says Pablo Gottfried, manager at Mexican wind developer Fuerza Eolica.



The CHP system powered Cat can provide 11.2 MW of electrical energy

Services: A Key Area for Private Participation

Services and energy efficiency are two key areas in which the private sector can be involved in the power industry in Mexico. Whilst according to CFE, IPPs will remain a secondary method of generation despite their advantages, the only limits on the need for services are the size and demand of the industry itself. 2012 was a comparatively quiet year for contractors and suppliers as CFE hesitated to increase spending during an election year, preferring to wait until the political change was finalized before making significant budgetary decisions. As a result, though the market has slowed in the past year, with the advent of business-friendly President Peña Nieto and CFE's own aims of extending and maintaining its services, CFE's spending will be renewed in 2013. In a speech given to the industry at the Technological Museum of CFE (MUTEC)

on 17th October 2012, former President Calderón explained: "One of our priorities over the last years has been to modernize the Mexican energy industry. This has been very important for us as it has a direct effect on the competition in the industry, the economic growth and the overall welfare of our society. We know that our country relies heavily on the energy industry and that it is key for the development of our country and this is why we have taken well planned steps that will have direct effects on its advancement."

Growth projections

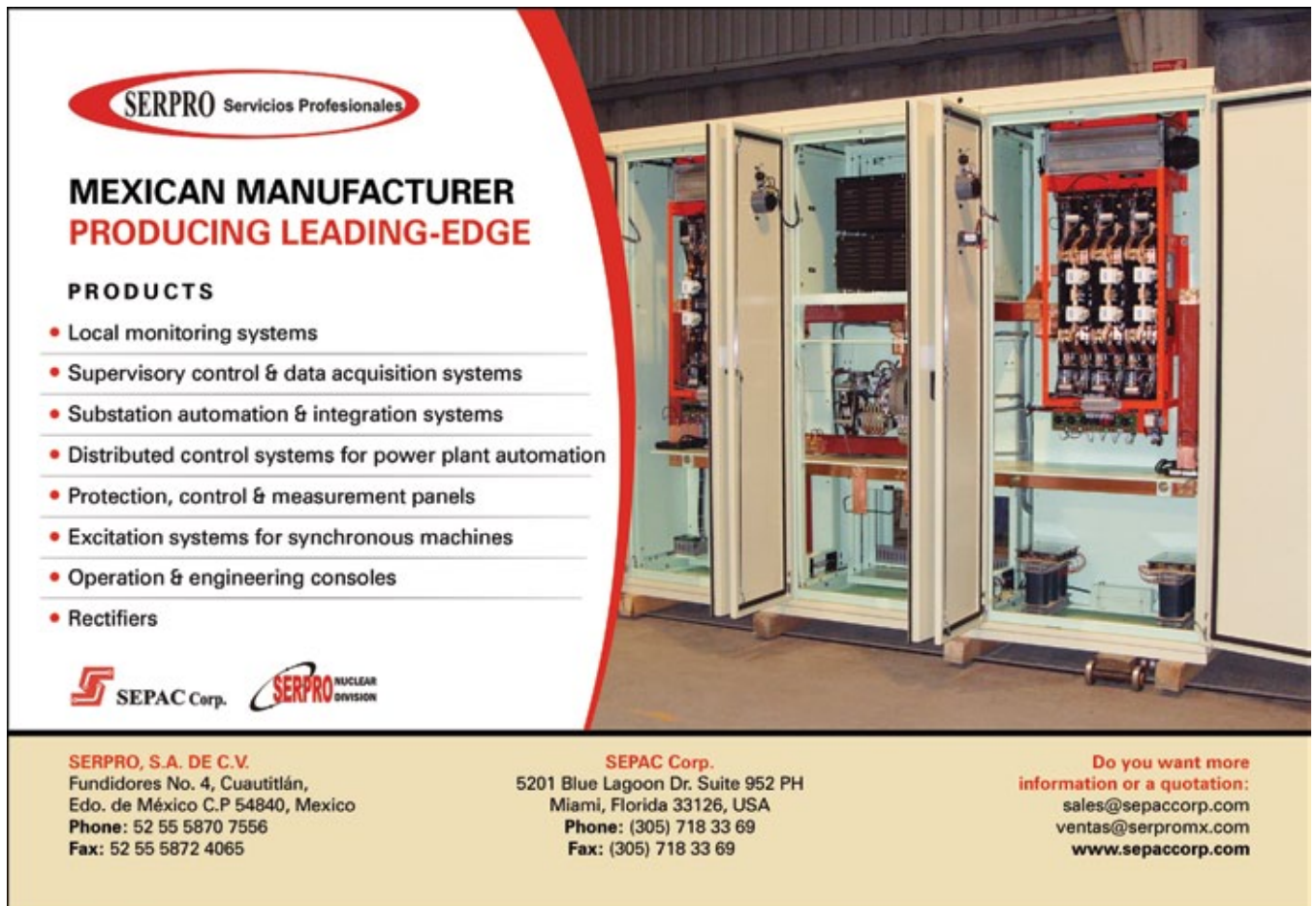
It is this will to modernize and advance within the federal government, and by extension CFE, that will push demand in the private sector. Lillian Lopez, general manager at Marley Mexicana which provides water-based cooling systems and solutions for power plants, is positive about the market's opportunities for Marley's business. "Compared to last year, this year has seen a lot of movement in the industry which has given many small businesses the bud-

gets to invest in our types of products. We now cover 65% of the market, which is a very good position to be in. Our hopes for growth this year may appear conservative at 15%, but this is a natural stutter caused by the election. With political stability restored, these figures will pick up again. From 2011 to 2012 our growth was 35%," she explains.

Alejandro Gutierrez Vera, general manager of Mexican company Serpro, is also very positive: "Over the past 10 years we have achieved a growth of about 100%, and since 2010, we have grown 20%. 35% of the electricity produced by the CFE is regulated by Serpro products. Pemex and the CFE are our biggest customers in Mexico and we also serve customers in Guatemala, the Dominican Republic, Chile, Argentina, Colombia and El Salvador. We are a Mexican company with Mexican engineers and have great expectations for growth."

Energy efficiency

Another key area in which there is growth within the energy services industry is the



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energy efficiency sector. In a market in which high consumption users are heavily penalized through the tariff structure, an initial investment in streamlining a company's electrical infrastructure means larger savings in the long term. Speaking at MUTEK, Calderón highlighted CFE's commitment to efficiency: "CFE, together with National Finances, is working on a program that will allow more than 200,000 SMEs [small and medium enterprises] to implement energy efficient practices by changing their lamps or their machinery, for example. The SMEs are vital for the future of any economy and, in Mexico, they generate eight out of 10 working opportunities. We have provided these companies with the opportunity to take credit to improve their energy efficiency and reduce their operating costs, which will ultimately benefit the final consumer. This program has already resulted in a savings as high as 60 million kW and a decrease of carbon emissions of 26,000 mt."

The private sector also provides high efficiency solutions, whether through installing smart lighting that switches

off in areas of buildings that are not being used, more frequent cleaning of air conditioning equipment, and switching to more modern heating and cooling systems. Multinationals such as Schneider Electric and General Electric have a wide array of solutions to offer, but local companies are nonetheless able to play a role. As both CFE and the private sector come to realize the advantages of energy efficiency, the sector will continue to grow. "Right now there is a wonderful opportunity in the Mexican energy market for energy efficiency companies as the CFE tariff structure is already expensive for medium industrial users. On the other hand, the current price of gas is cheap mainly because of the influence of shale. As a result, there is an impetus for companies to seek other options, whether energy supply or co-generation. In addition, the new climate change law encourages renewable and co-generation projects which adds to the Dalkia's potential in the Mexican market," Pradanos of Dalkia says.

Within both the power sector and the manufacturing sector, energy efficiency goes hand-in-hand with efficiency of production, as the production (and generation) process increasingly incorporates smarter operating systems. "Automation today in Mexico is a necessity, as Mexico needs to compete globally. As a result, efficiency and productivity need to increase, and automation is one key method that can achieve this. Mexico used to be very famous for its cheap labor, but this work method is not efficient. It is automation that has the most relevance for the future of Mexico. The automation sector will continue to grow, and we will be able to generate added value for our end customers," asserts Jose Luis Salinas, Key Accounts Manager for Oil and Gas, Chemical and Energy at Festo Mexico, the automation multinational whose cutting-edge work has included brain-computer interface (BCI).

Though 2012 was a period of reduced CFE spending due to the uncertainties of the political climate, 2013 will be

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a year of renewed development and growth in the CFE supply sector. Its key players are primed to make the most of the opportunities available.

Mexico's Vision

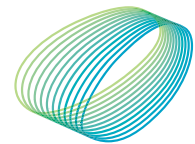
SENER's Program for Works and Investments in the Energy Sector (POISE), which is an outline of Mexico's energy strategy for the next 15 years, is ambitious in its vision. It identifies 43,992 MW of additional capacity that must be installed to meet with demand. 6,462 MW of this is already accounted for by projects that are currently in the construction phase or have entered the bidding process, but another 37,529 MW is for future projects that have yet to be defined. In addition, 539 MW of modernization must take place. During this period, the government plans to invest 100 billion pesos each year (approximately just under \$8 billion), with the bulk of it dedicated to generation at 52%, whilst distribution accounts for 20%, transmission 14.1%, and maintenance 13.3%. This influx of investment suggests a strong commitment to POISE's aims and, for the investor and company willing to work within a market shaped by an SOE, there are a lot of opportunities arising.

Santiago Barcon, managing director at Arteché, a global company offering automation solutions, is positive: "In the energy sector, the next 20 years will be extraordinary. Population growth, product consumerism linked to new lifestyles, and equipment obsolescence will all trigger opportunities for growth in a wide range of industries, including of course our own. For example, there will be a need to renew parts of already installed wind farms. There is economic stability and availability of labor, which allows one to plan with fewer worries. We currently export products, but my dream is to export engineering. We are in the same time zone as the USA and our engineers are as good or better as the ones from the United States; we can compete. Rather than watching fatalist and overly negative news reports, Mexicans and the wider international community must realize there is a lot to be done and that can be done in Mexico."

Though the energy sector remains and will remain for the foreseeable future under state control, the industry has nonetheless been able to implement the best practices that the private sector can provide, and in addition has succeeded in attracting the foreign investment that is vital to meet both the growing needs of the Mexican population and the clean energy require-

ments. With CFE behind the sector and committed to pushing the development of both gas infrastructure and renewables forward, the future for Mexico is bright. •

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